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**INSTITUTE FOR SCIENTIFIC AND EDUCATIONAL TECHNOLOGY (ISET)-  
EDUCATION, RESEARCH AND TRAINING PROGRAMS IN ENGINEERING  
AND SCIENCES**

By  
S. N. Tiwari, Principal Investigator

Final Report for the period ending December 31, 2002

Prepared for  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
LANGLEY RESEARCH CENTER  
HAMPTON, VA 23681-2199

Under  
Cooperative Agreement NCC1-349  
Dr. Samuel E. Massenberg, Technical Monitor  
Office of Education

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June 2003

## FOREWORD

The Old Dominion University, in cooperation with the Office of Education of the NASA Langley Research Center (LaRC), proposes a research, education, and training program entitled "Institute for Scientific and Educational Technology (ISET)." The proposed program is for a period of three years starting July 1, 2000. Dr. Surendra N. Tiwari, Eminent Professor of Mechanical Engineering, is the proposed principal investigator. The proposal is of interest to Dr. Samuel E. Massenberg, Director of Education, Office of Education, NASA Langley Research Center, Mail Stop 400.

The program activities are conducted in close cooperation with the Office of Education at LaRC. All activities of ISET are governed by an executive committee and managed by an organizing committee. ISET also has an advisory board comprising of selected individuals from local institutions and LaRC.

Extensive work has been conducted under this cooperative agreement. Ten graduate students received higher education degrees. They presented professional papers at National Conferences and published progress reports which has been documented. Other education, research, and training activities are summarized in Appendix A.

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## INTRODUCTION

The "Institute for Scientific and Educational Technology" has been established to provide a mechanism through which universities and other research organizations may cooperate with one another and with different government agencies and industrial organizations to further and promote research, education, and training programs in science, engineering, and related fields. This effort has been undertaken consistent with the national vision to "promote excellence in America's educational system through enhancing and expanding scientific and technological competence." The specific programs are directed in promoting and achieving excellence for individuals at all levels (elementary and secondary schools, undergraduate and graduate education, and postdoctoral and faculty research).

The program is consistent with the existing activities of the Institute for Computational and Applied Mechanics (ICAM) and the American Society for Engineering Education (ASEE) at NASA Langley Research Center (LaRC). The efforts will be directed to embark on other research, education, and training activities in various fields of engineering, scientific, and educational technologies. The specific objectives of the present program may be outlined briefly as follows:

1. Cooperate in the various research, education, and technology programs of the Office of Education at LaRC.
2. Develop procedures for interactions between precollege, college, and graduate students, and between faculty and students at all levels.
3. Direct efforts to increase the participation by women and minorities in educational programs at all levels.
4. Enhance existing activities of ICAM and ASEE in education, research, and training of graduate students and faculty.

5. Invite distinguished scholars as appropriate and consistent with ISET goals to spend their summers and/or sabbaticals at NASA Langley and/or ODU and interact with different researchers and graduate students.
6. Perform research and administrative activities as needed to carry out the above mentioned activities.

The implementation of various activities of the ISET programs is carried out through cooperative efforts between Old Dominion University (ODU) and the Office of Education at LaRC. At present, major efforts are directed on the following ISET Programs: ICAM Programs, Academic Programs, Educational Research, Outreach Programs, Educational Technology and Cooperative Programs. These programs are described in the following sections.

#### **ICAM: RESEARCH, EDUCATION, AND TRAINING PROGRAMS**

The Institute for Computational and Applied Mechanics (ICAM) constitutes a subprogram of the ISET. The main goal of ICAM has been to perform innovative research, and provide graduate education and training as a consequence of the research in a very important discipline of great national and international interest, computational methods. In the past, attention has been focused in the area of computational fluid dynamics (CFD), but the long-range goal of ICAM has been to provide intensive education, training, and research in other areas as well. In recent years, ICAM's activities have evolved to include education, research and training programs at all levels (precollege, college, graduate students, post-doctoral fellows, and faculty) in different disciplines because of the definite need to train a diversified group of individuals in sciences, engineering, and other related fields to meet the challenges of the new century. As such, the basic objectives of ICAM have been established as follows:

1. Perform research and training programs for interested faculty in specific fields of CFD and computational methods;
2. Invite distinguished scholars to spend their summers and/or sabbaticals at ICAM and interact with NASA/Langley and ODU researchers; encourage involvement of post-doctoral fellows to undertake intensive research programs of interest to NASA/Langley and ODU;
3. Develop and update ODU's interdepartmental curriculum for effective graduate instruction in important disciplines; offer intensive research and training programs for graduate students at the Master's and Ph.D. levels; emphasize participation by women and underrepresented groups in graduate programs; and
4. Develop effective procedures for providing graduate education to interested and qualified NASA/Langley employees; explore various areas of extensive research participation; exploit the knowledge and experience of NASA/Langley experts (as adjunct professors) in teaching selected courses; and organize special seminars, workshops and conferences of mutual interest.

Significant progress has been made in achieving the above objectives. Some recent activities and proposed programs for ICAM are discussed in the following subsections.

### **Recent Activities and Accomplishments**

Thirty-six graduate students have received various degrees, thus far, from ODU on the ICAM Fellowship Program. Many of the students graduating with the MS Degree went on for a Ph.D. Degree at ODU and other institutions. Several of these students are now employed by NASA and aerospace related industries. They

have made considerable contributions in their fields of research . Works of several students have been presented at various national and international meetings and conferences. Some of these works have been published in archival journals. At present, there are five graduate students associated with the ICAM Fellowship Program.

The faculty of the College of Sciences and the College of Engineering and Technology at ODU have varying degrees of expertise in Numerical Methods, CFD, Aerodynamics, Structural Dynamics, Materials, Hypersonics, and in other areas of research interest of LaRC. Selected faculty members have been associated with ICAM students. Most of the students have done excellent work in promoting the faculty research program. As a result of this effort, some faculty members have received grants from NASA to conduct independent research.

Limited funds are available for faculty and these are used very carefully to encourage the participation of selected faculty during the summer months. Within the constraints of limited resources, funds are provided to faculty to attend local and national conferences.

ICAM has encouraged visiting scholars activities and many distinguished individuals from the USA and abroad have participated in the program. Periodically, funds have been provided for such activities by specific research units at LaRC. Many of the visiting scientists, faculty, and post-doctoral fellows, have participated in organized seminars and workshops at Langley.

### **ICAM Minority Graduate Students Program**

Strong efforts are being directed to increase the participation by women and other minorities in the ICAM graduate program. The involvement of minority graduate students in the program is essential within the general guidelines of the ICAM educational program. This effort is designed to assist NASA, and the nation,

in alleviating the shortfall of science and engineering workforce skills. The specific effort, therefore, consists of a special minority graduate student program in science and engineering that would provide fellowships and graduate research opportunities for qualified students at NASA Langley Research Center. This effort is coordinated with the help of Dr. G. V. Selby of the Mechanical Engineering Department at ODU.

### **Major Thrust and Topic of Research**

Several general topics for conducting research have been identified by the ODU/ICAM faculty; these include the following:

1. Numerical and Computational Methods
2. Fluid Physics and Aerodynamics
3. Hypersonics and Aerothermodynamics
4. Combustion Processes and Propulsion
5. Aeroacoustics, Aerothermal Loads, Aerostructure, and Space Structures
6. Materials Research
7. Guidance and Controls
8. Biomechanics-Human Engineering
9. Atmospheric Studies-Troposphere and Upper Atmosphere
10. High Performance Computing
11. Optimization and Multidisciplinary Research
12. Aviation-Safety Research Programs

At present, efforts are directed mainly in the first four areas of research, and only limited (isolated) efforts have been directed in other areas.

## **Plans for Future Research Activities**

Currently five graduate students are being supported through the ICAM Graduate Fellowship Program. Research activities of most of these students are concentrated in the first four areas mentioned under the preceding subsection. Recently, we have also started cooperative work in the areas of optimization and multidisciplinary research.

The present trend for future research at LaRC appears to be in all the major areas mentioned in the preceding subsection. Specifically, efforts are being directed in areas such as parallel processing and high-performance computing, design optimization, multidisciplinary research, combustion processes and propulsion, and hypersonics. In the future, ICAM's research activities will be dependent upon the interest of individual faculty and LaRC associates. Several ODU faculty and NASA associates have indicated an interest to intensify efforts also in the areas of aeroacoustics, aerothermodynamics, artificial intelligence and robotics, and composite materials.

## **ACADEMIC PROGRAMS**

University research and education is under the auspices of the Center Director and the Director of Education at LaRC. This office serves as the primary focal point for university contact with LaRC. Individuals representing Institutions of Higher Education (IHEs), those attending IHEs, or those individuals interested in information regarding NASA's activities and opportunities with IHEs may contact the Office of Education for guidance. The Office of Education also serves as the focal point for internal customers who require information on IHEs and provides selected funding support for research scholarships, fellowships, and postdoctoral research associateships.

In cooperation with the NASA Langley administrators, Old Dominion University has been administering under a separate grant the American Society for Engineering Education (ASEE) - Summer Faculty Fellowship Program (SFFP) since its inception in 1964. Every NASA Center works cooperatively with a nearby university in a similar fashion to administer the SFFP (Stanford for Ames; Case Western for Glenn; etc.). In recent years, the NASA/ASEE SFFP has been administered in even years through the cooperation of Hampton University, an HBCU.

## EDUCATIONAL RESEARCH

NASA's Educational Research Program is closely related to the Academic Programs described in the previous section. However, it encompasses a much wider range of participants. Essential elements of the Educational Research Program are described in the NASA Publication, "NASA Implementation Plan for Education, 1999-2003," EP-1998-12-382-HQ.

Research relevant to NASA's four Strategic Enterprises is carried out primarily through NASA Strategic Enterprises, Field Centers, and the University community. However, some focused higher education programs are implemented by the Education Division and the Minority University Research and Education Division. Our goal is to streamline and focus these latter efforts so that they strongly support Agency research objectives as determined by the NASA Strategic Enterprises.

Research and development activities occur primarily, though not exclusively, at the graduate level and involve graduate students and faculty who make substantive contributions to NASA's mission, the four Strategic Enterprises, and the "Generate Knowledge" process. In addition to directly supporting NASA

programs, these activities promote the development of new collaborations with the academic community and significantly enrich graduate education and research.

ODU/ISET will participate intensively in various activities of the NASA's Educational Research Program as needed.

## **OUTREACH, ENRICHMENT, AND ENHANCEMENT PROGRAMS**

Langley Research Center offers a full complement of the NASA core programs at the elementary and secondary level including specific precollege education programs, technology programs, and a host of educational publications designed primarily for usage in the classroom. These elementary and secondary student/teacher initiatives promote an understanding of an integrated application of science, math, technology, and related subject matter through curricula infusion and expansion and by providing innovative instructional opportunities for students and teachers. It was recognized long ago that simply working with aerospace graduate students could not assure a future stable source of engineering talent for the nation. NASA now actively intervenes at the undergraduate and precollege levels to increase the pipeline of youngsters interested in a scientific career. The entire program is administered in cooperation with the personnel from Old Dominion University.

## **EDUCATION COMPUTER AIDED TRACKING SYSTEM (EDCATS)**

In the past, the coordinated academic enhancement support (CARES) system was used to provide an effective means of maintaining relevant current and historical information on NASA funded students through a range of educational program initiatives. In recent years, the CARES system has been replaced by the Education Computer Aided Tracking System (EDCATS). ODU/ISET will participate

in educational data collection through EDCATS.

The NASA EDCATS collects the first level of monitoring and evaluation data common to all Agency education programs. Though EDCATS also provides an on-line means for programs to collect, store, and analyze their own "Program or Center unique" data, EDCATS does not monitor this data or use it in compiling Agency Education Reports. Each NASA Education Program Manager is responsible for its own follow-up and in-depth studies. EDCATS provides general guidelines to use for conducting these kinds of studies, but will not be involved in the studies or their analysis. EDCATS, however, does provide links and methods to post these studies on the Internet and makes them accessible from the NASA Education Programs Home Page. In general, activation and customization of programs into the EDCATS on-line system is prioritized using the following order:

1. National Agency Programs
2. Multi-Center Programs
3. Center Unique Programs
4. Enterprise Unique Programs
5. NASA Partnerships Programs

## EDUCATION TECHNOLOGY

A major enabling system identified as essential to all NASA education programs is the effective utilization of educational technology. NASA is an agency dedicated to the development of advanced technologies, and it is appropriate that technology be transferred into the operation of its academic research and education program. The intent of the Office of Education is to utilize educational technologies to the fullest potential in order to maximize limited resources and expand the delivery of programs to the broadest possible audience.

It is desirable to expand NASA TV programs to better serve the education community by including regular segments of programming for faculty, teachers, and students. A weekly segment of educational programming should be implemented for informing educational organizations, networks, and teachers of NASA Select and LaRC Educational TV program opportunities.

NASA's Education Resource Center (ERC) should be expanded and integrated into the educational technology component of LaRC's education program by installing appropriate equipment and software for the demonstration or duplication of computer software, videodiscs, and CD-ROM disks. A plan will be developed and implemented to transfer existing and new slides, videos, publications, and similar educational materials to optical media such as CD-ROM or videodisc for cost-effective storage and distribution. ISET will continue to coordinate these activities with other relevant groups and programs.

## COOPERATIVE PROGRAMS

There are several challenging areas where individuals in different programs may cooperate to achieve a common goal and make the entire program very effective. A few examples for possible cooperative programs are presented here.

There are a variety of potential interactions between ASEE faculty, involving their summer research programs, and the ICAM researchers and their year-round research programs, that can enhance both programs. This could include research in the same or similar areas of active research programs. Collaborative research by ASEE and ICAM faculty will strengthen both programs synergistically, which will be cost-effective for the government.

Interactions between ASEE and ICAM faculty and graduate students in the Langley Aerospace Research Summer Scholars (LARSS) program and the Graduate

Student Researchers Program (GSRP) will be another cost-effective way to produce beneficial research for all parties involved. This will have added benefit of reducing the supervision load by LaRC Associates.

For proper education and training of students in the NASA educational programs, it is essential to have interactions between precollege, college, and graduate students, and between faculty and students at all levels. There is presently little or no understanding of the factors that control the student pipeline flow from precollege to graduate school, or how the proportion of students exiting the pipeline into technical graduate schools can be maximized to NASA and the nation's benefit. Data from the Office of Education will be analyzed to study this question.

### CONCLUDING REMARKS

Efforts will be directed to the basic activities of ICAM, ASEE, and cooperation with the Office of Education at NASA Langley. These activities will be managed by the Principal Investigator with help from the members of the ISET Organizational Committee (L. B. Evans, K. C. Powell, J. Pulley-Bibbo, and P. D. Thomas). The effective implementation of the various programs will require extensive cooperation (through a Cooperative Education Grant) with the Office of Education at LaRC.

**APPENDIX A**

• Degree: Associate in Computer Art

• Phone: 864-9460

August 30, 1999

TO: Dr. Surendra N. Tiwari, Director, "Institute for Scientific and Educational Technology (ISET)"

FROM: Gwendolyn H. Wheatle – ISET Administrative Assistant (*Office Assistant*)

SUBJECT: Position Duties and Responsibilities, and Work-Related Activities  
(July 1998 – June 1999)

The basic implementation procedures for the **Teacher** outreach enrichment and enhancement programs are discussed here.

**A. NASA Educators Workshop (NEW)**

Plan and coordinate the NEW workshop for 22 K-12 teachers. Coordinating the program entails setting-up hotel accommodations for out-of-state teachers, providing literature, activities, tours, lectures, workshop facilities, and preparing closing ceremonies and final reports. This workshop enables teachers to adapt their new content knowledge, experience, and materials into their specific educational situations.

The basic implementation procedures for the **Student** outreach enrichment and enhancement programs are discussed in the next section.

**B. MATHCOUNTS**

Plan and coordinate the national coaching and competition program MATHCOUNTS. Preparation for the program begins early in the school year, and is held annually during the month of February. This program is designed to stimulate 7<sup>th</sup> and 8<sup>th</sup> grade students interest and achievement in mathematics. The responsibilities entails preparation of NASA materials and facility for competition.

**C. DISTANCE LEARNING/EDUCATIONAL TECHNOLOGY**

NASA Connect Series is a television program that emphasizes the national mathematics and science standards, the information literacy standards for student learning, and the national computer/technology standards. Responsibilities entail administrative support in sending out correspondence and brochures to over 65 thousand educators to include program evaluation materials, and to assist in preparation of graphics for the lesson plan booklet.

**D. NASA PRECOLLEGE PROGRAMS**

In his capacity, I work closely with the precollege officer. My duties and responsibilities in this area are targeted for students, teachers, and education administrators. Administrative and graphics support are provided for many of the precollege programs.

In addition, I am creating websites for education programs. The latest being "National Engineers Week".

**E. INSTITUTE FOR COMPUTATIONAL AND APPLIED MECHANICS (ICAM) AND INSTITUTE FOR SCIENTIFIC AND EDUCATIONAL TECHNOLOGY (ISET)**

Provide administrative support to Dr. Tiwari in implementing ODU's research projects related to the ICAM AND ISET programs.

**G. OTHER RESPONSIBILITIES**

1. I am frequently called upon to support the Director of the Office of Education, and to give administrative support to other program managers within the office of education. These activities may include special projects requiring administrative support.
2. On many projects, I design the graphics for certificates, flyers, cover pages, as well as other graphic requirements.

# OLD DOMINION UNIVERSITY

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Department of Mechanical Engineering  
241 Kaufman/Duckworth Hall  
Norfolk, Virginia 23529-0247  
Phone: (804) 683-3720  
FAX: (804) 683-5344

June 2, 1998



TO: Dr. Surrendra Tiwari

FROM: Gwendolyn H. Wheatle  
Administrative Assistant  
Office of Education

RE: **Job Responsibilities**

As requested, please find below a narrative description of my duties and responsibilities in the NASA Langley Office of Education. These responsibilities have been categorized within three major function areas within the Office of Education including: Distance Learning and Educational Technology; Precollege Programs; and University Programs. A separate category detailing other required activities is also included under "Other Responsibilities".

## I. **Distance Learning/Educational Technology**

Duties and responsibilities include providing graphic/administrative support for educational programming activities. In this capacity, I work as part of a team with Dr. Tom Pinelli, Technology and Distance Learning Officer. The most recent program, CONNECT, required me to handle much of the correspondence that had to be sent out to school systems and others involved with the project. Post-program activities included continued administrative/graphic support for correspondence to teachers to include program evaluation materials.

Much of this work requested for this project has required proficient use of advanced graphics programs that would ordinarily have to be sent out to be produced, ( i.e., Photoshop, Quark Express and Illustrator).

## II. **Precollege Programs**

In this capacity, I work as part of a team with Dr. Marchelle Carright, Precollege Officer. My duties and responsibilities in this area are targeted for students, teachers, and education administrators. Administrative and graphics support is provided for many of the precollege programs including

Space Science Student Involvement Programs (SSIP), National Technical Association (NTA) Math Contest for students, MATHCOUNT Coordinator for the Center and the NASA Educational Workshop (NEW) formerly, Langley Teacher Enhancement Institute (TEI) to mention a few.

I am responsible for all administrative/graphic activities associated with NEW which takes place during the summer for 2 weeks for 20 teachers. I also work very closely with the NEW summer faculty who also require administrative/graphic support as well as general administrative task.

In addition, I am creating websites for education programs. The latest being "NASA Celebrates Spaceday".

### **III. University Affairs**

Duties and responsibilities include working very closely with Mr. Roger Hathaway, University Affairs Officer on specific University programs including: NRC, GSRP, and ASEE. On these programs, I assist by providing general information to many of the customers requiring information; and, assisting in processing applications during peak periods.

A major part of my University activities includes the administrative/graphics support needed in order for Mr. Hathaway to submit proposals to NASA Headquarters and other external funding sources, i.e., Preservice Teacher Conference proposal.

I assist Mr. Hathaway with special short term university-related projects that require implementation, i.e. the NASA Langley Pre-Service Teacher Conference that attracted over 300 preservice college students and their faculty.

### **IV. Other Responsibilities: Dr. Samuel E. Massenberg, Director, Office of Education**

I am frequently called upon to support the Director of the Office of Education's office, Dr. Massenberg. These activities may include special projects requiring administrative support.

An additional responsibility, requested by Dr. Massenberg, is to maintain an ongoing folder of all OEd photographs. This folder includes all OEd related photos depicting activities and programs with students, teachers, faculty, and OEd Staff.

**V. Other Responsibilities: Dr. Sandra B. Proctor  
Special Assistant for Education, Office of Education**

Dr. Proctor's work generally is in the area of University and Precollege activities. I provide all of her administrative, clerical, and graphics support for all of her projects. I work very closely with Dr. Proctor on a host of projects including all of her proposals for funding; special meetings with teachers and other academicians; and pre and post conference planning activities.

On many of her projects, I design the graphics for certificates; flyers; cover pages, as well as other graphic requirements. Additionally, I have been designated as the primary point of contact in handling questions, providing information, as well as drafting correspondence to participants.

**VI. Other Responsibilities: Dr. S.N. Tiwari, Eminent Scholar,  
Research Coordinator**

I am frequently called upon by Dr. Tiwari for administrative support in implementing ODU's research projects for the Institute for Computational and Applied Mechanics (ICAM) and Institute for Scientific and Educational Technology (ISET).

Degree: Associate in Applied Science  
Specialty: Office Systems Technology August 31, 1999  
Phone: 864-9266

TO: Dr. Surendra N. Tiwari, Director, "Institute for Scientific and Educational Technology (ISET)"

FROM: Jennifer E. Trinkle - ISET Education Specialist/Office Assistant

SUBJECT: Position Duties and Responsibilities and Work-Related Activities (July 1998 - June 1999)

A complete description of my position duties, responsibilities, and work-related activities for July 1998 to June 1999 is provided in the following sections:

**A. Provide administrative support to the Office of Education.**

I assist the Secretary to the Director for the Office of Education. Some of my everyday tasks include greeting visitors to the office, answering telephones and directing the callers to the proper contact, and receiving and distributing mail. I assist with the orderly maintenance of the office filing system along with keeping an accurate filing guide that helps with prompt file location. I maintain a log of staff leave schedules along with an action items log to track action due dates, status, and responsible individuals. If an action is past due, I check on the reasons for the late response. The web is used daily to locate information needed by office personnel.

**B. Coordinate official business travel for the Office of Education.**

Preparing official business travel includes making the necessary transportation and lodging arrangements according to the traveler's needs and preferences. Travel orders are then prepared for the proper approving signatures before being forwarded to the Center's travel office for processing. If there is a registration fee to be paid, the travel orders are first routed to the training office before arriving in the travel office. I prepare a detailed itinerary for the traveler upon the completion all of the necessary arrangements. On occasion, I provide out-of-town incoming visitors with lodging options, directions to the Center from the airport or hotel, and other necessary information to assist the visitors with their accommodations.

**C. Prepare routine correspondence.**

I prepare correspondence as well as edit the work of Office of Education personnel to ensure that it is in accordance with NASA regulations. Correspondence that requires signatures and/or concurrences other than by the Office of Education is tracked by the Center correspondence tracking log so that the location or status of the material is known at all times. When required, I take dictation and transcribe it into the correct format for the proper signatures and concurrences.

**D. Office of Education key activity preparation and submission.**

On a weekly basis, I collect inputs from the entire Office of Education staff for the office's weekly submission to the Center's senior staff key activities compilation. I edit each input and insert them into one document for the required approvals prior to submission. The protocol for the submission of these key activities has recently changed. Each activity must be individually posted on the web. Our office's inputs are then in turn pulled off of the web and placed into the main senior staff document for distribution each Friday morning.

**E. Coordinate meetings.**

I assist in keeping the staff informed of upcoming meetings. One way of accomplishing this mission is by maintaining a monthly activity calendar for the office and by updating the information on a weekly basis. I make appointments for the Director of the Office of Education and prepare a daily calendar for his use. Ensuring that the Director, Deputy Director, and Distance Learning Officer for the Office of Education are adequately prepared for meetings, travel, and presentations is another important duty of mine, including the preparation of presentation and meeting aides. As required, I take notes at meetings and telecons and then prepare these minutes into a document to be distributed to all meeting attendees and others as necessary.

  
Jennifer E. Trinkle  
49266

Degree: B.S. (Business Adm.; Major - Management, Minor - Education)

August 31, 1999

TO: Dr. Surendra N. Tiwari, Director, "Institute for Scientific and Educational Technology (ISET)"

FROM: Kathleen C. Powell - ISET Education Specialist *K*

SUBJECT: Position Duties and Responsibilities, and Work-Related Activities

A complete description of position duties, responsibilities, and work-related activities for Kathleen C. Powell is provided in Section I for July 1997 - June 1998 and Section II for July 1998 - June 1999.

## Section I

### A. Support Director, Office of Education in educational program administration and educational information dissemination.

1. Compose and edit correspondence for the OEd.
2. Compose, compile, and submit OEd input for Headquarters' reports/requirements such as:
  - Annual Accomplishment Report for Equal Opportunity & Diversity Management.
  - Annual Center Director's Assessments Report.
  - Annual Federal Equal Opportunity Recruitment Program (FEORP).
3. Assist with special projects upon request.
4. Completed project that involved interviewing prominent NASA engineers, scientists, and technicians accompanied by photographs to be used for input for the ALLSTAR SCALE-UP software project that provided Florida International University students information concerning the future careers that would enhance their mathematic and science skills, July, 1997.

### B. Support University Affairs Officer in LaRC University outreach enrichment and enhancement activities:

1. Support University Affairs Program Managers in their activities and responsibilities.
2. Compose and edit correspondence for University Affairs Officer.
3. Prepare Office of Education's input to the NASA Tribal Colleges and Universities Programs report.
4. Compile information and statistics for Headquarters' Annual Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) Plans and Reports.

Phone: 964-7164

Degree: B.S. (Business Admin-minor in Education) - call to confirm

August 31, 1999

**TO:** Dr. Surendra N. Tiwari, Director, "Institute for Scientific and Educational Technology (ISET)"

**FROM:** Kathleen C. Powell - ISET Education Specialist

**SUBJECT:** Position Duties and Responsibilities, and Work-Related Activities

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### **B. Support University Affairs Officer in LaRC University outreach enrichment and enhancement activities:**

1. Support University Affairs Program Managers in their activities and responsibilities.
2. Compose and edit correspondence for University Affairs Officer.
3. Prepare Office of Education's input to the NASA Tribal Colleges and Universities Programs report.
4. Compile information and statistics for Headquarters' Annual Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) Plans and Reports.

5. Conduct tours, attend career fairs, and serve as panel member as Office of Education representative with activities such as the Pre-Service Teacher Conference and The Chesterfield Heights Math and Science Academy. Attended a first-time Career Fair at Bayside Middle - Sixth Grade Campus, June, 1997. Approximately 20 vendors from industry and other organization represented at the fair. Bayside's student body consist of 500 students with 22 teachers. Distributed educational materials and informed the students of programs and career opportunities available at NASA Langley.
6. Gather and submit weekly key activity information for University Affairs Office to Director of Office of Education.
7. Assist in planning and coordinating meetings for university/college visitors.
8. Assisted in finalization of Minority Institutions of Higher Education Research Strategies and Funding Opportunities Workshop.
9. Coordinated initial organization of S'COOL Project, an Outreach Project.
10. Distributed 350 copies of the Partnership Awards for the Integration of Research and Mathematics, Science, Engineering and Technology Undergraduate Education (PAIR) solicitation to OMU's HSI's and LaRC Research Groups Point of Contact.
11. Developed email address book with over 300 minority contacts as a channel to distribute research announcements, job opportunity announcements, and other pertinent information to be disseminated to minority institutions.

**C. Plan, coordinate, and present outreach activities for the Satellite Committee People with Disabilities**

1. Serve as Chairperson for the Outreach Subcommittee of the Satellite Committee People with Disabilities. Attend monthly meetings of SCPD and schedule and chair quarterly meetings of the Outreach Subcommittee.
2. Planned "Sunshine Too" group presentations as an outreach activity presented at the H. J. E. Reid Conference Center, NASA Langley for the Center employees and the community.
3. Planned presentation by Dr. Ronald E. Godby on 'Operation Smile' for Center employees and the community as an outreach activity.
4. Assisted with activities of LaRC Disability Awareness Day, October 17.
5. Served as member of the Multicultural Leadership Team (MCLT) Sub-Team
6. Attended the 1997 Annual Conference of the President's Committee on Employment of People with Disabilities, June 3-5, Washington, DC

## **Section II**

A complete description of position duties, responsibilities, and work-related activities is provided in the following sections for July 1998 - June 1999:

### **A. Support Director, Office of Education in educational programs administration and educational information dissemination.**

1. Compose and edit correspondence for the Office of Education such as student requests for scholarships and general requests for the Office of Education program information.
2. Assist with reports/requirements such as:
  - Annual Accomplishment Report for Equal Opportunity and Diversity Mgt.
  - Annual Federal Equal Opportunity Recruitment Program (FEORP)
  - LaRC Historically Black Colleges and Universities (HBCUs) Performance Report
3. Assisting with updating Office of Education Year 2000 Information Guide which is widely distributed to universities, colleges, businesses, etc. as a quick and easy reference for educational programs and activities affiliated with the Office of Education.
4. Assisted with planning and coordination of conferences such as one held in partnership with Sarah Bonwell Hudgins Foundation, Inc. entitled 1999 Education Conference, "The Challenges of Aging: 'Weighing the Ups and Downs,' the Pre-Service Teacher Conference, held April 30.
5. Office of Education meeting representative for NASA Langley Child Development Office of Education, July 1.
6. Assist with special projects upon request.

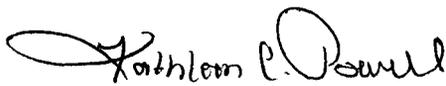
### **B. Support University Affairs Officer in LaRC University outreach enrichment and enhancement activities:**

1. Participation and involvement with Cooperating Hampton Roads Organizations for Minorities in Engineering (CHROME) Program. Coordinated visit of Mr. Raul Mejia, Engineer at LaRC, to Grafton Middle School, for presentation to CHROME Club members followed by coordination of his attendance to Grafton Middle School's awards ceremony. Other CHROME activities include organizing LaRC's portion of 'All Members' CHROME Meeting to be held at the H. J. E. Reid Conference Center, September 30, and assisting in coordination of plans for CHROME STARS Annual Luncheon to be held December 2.
2. Compiling and organizing photograph file for University Affairs Programs, beginning September, 1999.
3. Gather and submit weekly key activity information for University Affairs Office to Director of Office of Education.
4. Maintain Fast Track Chart of University Affairs activities including programs managers' activities, distance learning events, and conference and career fairs.

5. Assist with Center tours and give presentations at career fairs for events such as the '98 Pre-Service Teacher Conference and Career Fairs at Bayside Middle School, VA Beach, VA; Conventry Elementary School, Grafton, VA; and participation in a Scientific and Technical Career Day on February 25, 1998, at Norfolk State University. Also, assist with Career Days as a part of National Engineers Week, February, 1998, NASA Langley. Also, participated in a panel discussion entitled, "Women in Aerospace," February, 1998.
6. Point of contact for Student Inquiry Database for Contracts, Cooperative Agreements, and Grants with LaRC funded Universities and Colleges.
7. Assist with the planning and coordination of Pre-Service Teacher Conference and Institute.
8. Coordinated partnership of Norfolk State University and NASA Langley Photographic Laboratory with training for Norfolk State students for Kodak Slow Motion Analyzer.
9. Coordinated with Hdqtrs. Minority University and Education Program (MURED) for proposal review and selections for award of LaRC NASA Partnership Award for Innovative and Unique Education and Research Projects.
10. Actively use email address book with over 300 minority contacts as a channel to distribute research announcements, job opportunity announcements, and other pertinent information to be disseminated to minority institutions.

### **C. Equal Employment Opportunity Office - Disability Program**

1. Attended Disability Awareness Conferences such as the 1998 Greater Hampton Roads Disability Conference, Williamsburg, Marriott, April 8, and the 8th Annual Virginia Assistive Technology Conference, May 6-8, at the Holiday Inn, Norfolk.
2. Received Certificate of Recognition at The Hampton Mayor's Committee for People with Disabilities luncheon held October 30, Hampton Holiday Inn Conference Center, Hampton, VA, to recognize my outstanding contribution and continued assistance to the disabled population of this community through my work as Chairperson of the Satellite Committee for People with Disabilities, NASA, LaRC.
3. Assisted with planning and coordination with Center Equal Opportunity Office and the Satellite Committee for People with Disabilities with Disability Awareness Day activities on October 16, Pearl I. Young Theater, including performance of Comedian Brett Leake.
4. Assisting with planning for Disability Awareness Day to be held Tuesday, November 9, H. J. E. Reid Conference Center, Hampton, VA.



Kathleen C. Powell  
864-7164

**Institute for Scientific and Educational  
Technology**

**July 1998 - June 1999**

**Program Responsibilities  
and Work-Related Activities**

**Submitted By: Lloyd B. Evans - *Research Associate I***  
**August 30, 1999**

**Degree: B.A. (Business Administration)**  
**M.S. (Education) - Focus on Technology**

**Phone: 864-5209**

**TO:** Dr. Surendra N. Tiwari, "Institute for Scientific and Educational Technology (ISET) Principle Investigator"

**FROM:** Lloyd B. Evans -- (ISET) Higher Education

**SUBJECT:** Position Duties and Responsibilities, and Work-Related Activities (July 1998 - June 1999)

A complete description of position duties, responsibilities, and work-related activities is provided in the following sections:

**A. Graduate Student Researchers Program (GSRP)**

**Program Objectives** - To cultivate additional tries to the academic community. To provide graduate students with NASA mission information, education experiences, and research opportunities designed to promote their interest in science, engineering, math, technology, and geography.

**Program Description** - The GSRP is a fellowship that pays up to \$22,000 a year, are renewable based on satisfactory progress, and available funding. They are renewable for a total of three years. Students may apply at any time during their graduate career or prior to receiving their baccalaureate degree. An applicant must be sponsored by his/her graduate department chair or faculty advisor. Awards may not concurrently accept any other Federal fellowships or traineeships.

**1998/99 GSRP Demographics**

<b>Total Applications Received</b>	<b>96</b>	<b>Ethnicity:</b>	
<b>Total Participants:</b>	<b>58</b>	<b>Minority Percentage</b>	<b>19%</b>
<b>New Awards</b>	<b>24</b>		
<b>Universities Represented:</b>	<b>27</b>	<b>Target Degree</b>	
<b>HBCU's</b>	<b>1</b>	<b>MS</b>	<b>21</b>
		<b>MS/Ph.D.</b>	<b>5</b>
		<b>Ph.D.</b>	<b>32</b>

**Program Accomplishments** - The Program received 96 applications and awarded 24 new fellowships. The GSRP provided unique and rewarding research experiences for 58 full-time graduate students at 27 universities or colleges. One hundred percent of the Program participants conducted research or participated in technical discussion at the Center during the past year. The three-day Orientation and Workshop consisted of programmatic briefings, technical presentations by second and third-year fellows, research-based discussions with Langley Research Advisors, and tours of the Center's facilities. The Office of Education has incorporated a unique and informative activity into the Orientation and Workshop. A student panel consisting of second and third year graduate students with broad GSRP experiences identified obstacles they had to overcome, described areas of graduate school that may cause concern, and suggested procedures that will enhance a student's GSRP experience. The National Research Council awarded three GSRP alumni with Resident Research Associateships at NASA Langley Research Center. The following planning, development, implementation, and evaluation tasks were accomplished:

**Program Planning Tasks** - Consist of identifying internal/external resources, securing Program support equipment, materials, and supplies. Coordinate activities for Annual three-day GSRP Orientation and Workshop, coordinate activities for Graduate Career Seminar, and solicit research opportunities for publication of the annual GSRP booklet.

**Program Development Tasks** - Consist of processing requests for Program information, completing administrative application process, conducting the application competitive review/evaluation

**Program Implementation** - Consist of announcing fellowship awards, processing new award funding, publishing research opportunities for annual GSRP booklet conducting Annual GSRP Orientation and Workshop, and participating in the Graduate Career Seminar.

**Program Evaluation** - Consist of developing and processing student and faculty program evaluations, developing GSRP Annual Report, and implementation of continuous Program improvement initiatives.

**Recruitment Trips:** National Society of Black Engineers Annual Conference (NSBE), Society of Hispanic Professional Engineers Annual Conference (SHPE), Hispanic Association for Colleges and Universities (HACU), Annual Conference for The Society for the Advancement of Chinos and Native Americans (SACNAS), Career Day, University of Maryland, Baltimore, MD

**Professional Travel -** Annual GSRP Program Representatives Meeting, Washington, DC, The National Consortium for Graduate Degrees for Minorities in Engineering and Science Meeting, NASA Headquarters, Washington, DC

**Professional Meetings -** Norfolk State University Quarterly Cluster Meeting, Hampton University Quarterly Cluster Meeting, Combined Hampton Roads Opportunities for Minorities in Engineering Quarterly Meeting

## **B. National Research Council (NRC) Resident Research Associateship (RRA)**

**Program Objectives -** To provide postdoctoral scientist and engineers of unusual promise and ability opportunities for research on problems, that are compatible with the research interest of the sponsoring NASA Center and (2) to contribute thereby to the overall research efforts of the NASA Center.

**Program Description -** The National Research Council conducts the Research Associateship Programs in cooperation with sponsoring federal laboratories and research organizations approved for participation. The Research Council, through its Associateship Programs Office, conducts a national competition to recommend and make awards to outstanding scientists and engineers at recent postdoctoral and experience senior levels for tenure as guest researchers at participating laboratories.

### **1998/99 NRC Associateship Demographics**

Total Applications Received	20
Total Participants:	36
New Awards	8
US Citizens	26

**Program Accomplishments** - The 1998/99 National Research Council Resident Research Associateship Program participated in the NRC RRA Workshop held at the Center. The objectives of the Workshop were to brief current concerns, provide an opportunity for Associates to discuss their research projects with peers, and discuss the status of the Program from the Associate's perspective. Dr. Arnold Schwartz, Director of Associateship Programs for the National Research Council conducted a three-day site visit of LaRC's RRA Program. The objectives of the site visit were to meet with Associates and their Adviser, to discuss the status of the NRC's RRA Program, and conduct technical presentations to an audience comprised of Dr. Schwartz and visiting NRC staff members, NASA LaRC Advisers, and the Associate's peers. Due to new NASA Headquarters costing metrics a data base accounting process was developed and implemented. This process has proven itself to be accurate and up-to-date. During this period the Associates published 58 journal articles, completed 42 professional travel trips to conferences, and six programmatic travel trips. Additionally, five of the 10 LaRC Civil Servants appointments were NRC Associates. The following planning, development, implementation, and evaluation tasks were accomplished:

**Program Planning** - Identify internal/external resources, secure Program support equipment, materials, supplies, coordinate activities for Annual Associateship Workshop, coordinate activities for Annual NRC Site Visit, solicit research opportunities for annual LaRC research opportunity booklet

**Program Development** - Process requests for Program information, complete administrative application process and proposal evaluations for October, February, and June Reviews, Manage LaRC Adviser Nomination, perform NRC Program administrative support requirements, process NASA Headquarters Code S,Y, and U NRC RRA fiscal requirements.

**Program Implementation** - Announce Associateship awards and process award funding, maintain Associate's financial records, publish research opportunities for annual LaRC Research Opportunity Booklet, conduct Annual Associate Workshop, plan and manage annual NRC Site Visit.

**Program Evaluation** - Review and process six-month progress reports, annual Associate evaluations, final reports, and implement continuous program improvement initiatives.

**Recruitment Trips:** National Society of Black Engineers Annual Conference (NSBE), Society of Hispanic Professional Engineers Annual Conference (SHPE), Hispanic Association for Colleges and Universities (HACU), Annual Conference for the Society for the Advancement of Chinos and Native Americans (SACNAS), Career Day, University of Maryland, Baltimore, MD.

**Professional Travel -** Annual NRC Program Representatives Meeting, Washington, DC, The National Consortium for Graduate Degrees for Minorities in Engineering and Science Meeting, NASA Headquarters, Washington, DC, National Research Council Financial Planning Meeting, Washington DC.

BA International Relations / GOVT.  
MS Human Resource Mgmt  
MS Education

864-3117

Appendix A5

August 20, 1999

TO: Dr. Surendra N. Tiwari, Director ISET  
FROM: Peter D. Thomas, Education Programs Specialist (*Research Associate II*)  
SUBJECT: Position Duties and Responsibilities and Work-Related Activities  
July 1999 - June 2000

**A. The basic implementation procedures for the Teacher outreach enrichment and enhancement programs are as follows:**

**1. NASA Education Workshop (NEW) K-6**

a. Twenty-five teachers are exposed for a 2-week summer program to the most recent developments in NASA projects and activities. Topics such as aeronautics, atmospheric, space science and interplanetary exploration will be investigated. In addition, the teachers will have access to NASA educational materials and discover the educational programs services available to schools. I am the overall coordinator for this program. This entails setting up curricula, scheduling, conducting tours to facilities, delivering lectures, and conducting all operations. I coordinate and teach most of the aeronautics aspects of this workshop.

**B. The basic implementation procedures for the Student outreach enrichment and enhancement programs are as follows:**

**1. New Horizon Regional Education Center (The Governor's School For Science and Technology) Mentorship:**

a. This annual academic year program normally encompasses 10-15 students who are paired with a NASA researcher, scientist or technician. The students will experience an out-of-school experience with hands-on applications in mathematics and science or technology application in the work place. I match students with mentors, coordinate access to facilities and handle the requisite security issues.

**2. Virginia Governor's School NASA Mentorship Program (for the Gifted & Talented):**

a. This 5-week summer program is held at NASA Langley during working hours and the 14-students are domiciled at Christopher Newport University. This program offers unique opportunities and challenges for the participants. The mission of this program is to prepare students for both the intellectual demands of science at the college level with the social and emotional demands of college life. I match students with mentors, coordinate access to facilities and handle the requisite security issues. A letter of Appreciation, signed by the Governor of Virginia, has been received for each of the last 7-years.

**3. Precollege Career Shadowing for High School Technology Students:**

a. Coordinate three school district's technology education and pre-engineering students shadowing experiences at NASA Langley throughout the academic year. The purpose of the program is to stimulate the interest of high school technology education students in engineering, mathematics, science and technology by providing the opportunity for them to explore potential careers in a scientific environment. I match students with mentors, coordinate access to facilities and handle the requisite security issues.

4. Earth Knowledge Acquired by Middle School Students (EarthKAM):

a. Coordinate activities using the Internet of selected pilot schools in three states (NC, SC & VA) on a unique educational experience through a space-based program to provide students with the capability to take images of the earth from the Space Shuttle for investigative projects. This is normally an academic year program, but it does entail some out-of-school activities due to the scheduling of mission launches.

5. Develop and improve NASA Langley Internet Web sites to reflect NASA Langley aerospace educational outreach potentials:

a. Develop and submit hands-on activities to enhance existing and new web sites in the fields of ASTT and HEDS. Currently three web sites have been developed with more on the horizon.

**C. Participation in the following partnership programs is as follows:**

1. Peninsula Engineer's Council (PEC) - Educational outreach presentations and cross talk is facilitated for high school students from the surrounding educational districts, each year during Engineering Week. Monthly meetings are needed to establish and coordinate efforts of 26 engineering organizations to provide educational outreach to school districts. The culmination of the program is a 2-day Career Days program, which provides aerospace careers information concerning engineering, mathematics and science to 350 students daily, normally in February.

2. Contractor Steering Council Aerospace Careers Educational Program (CSC) - This monthly activity provides a common ground for the meeting of support service contractors and civil service members to formulate a better understanding of relevant issues. The educational initiative is designed to reach middle school students from the sixth grade. The school districts on the Virginia Peninsula are the recipients of in-class presentations from researchers, scientists, technicians and business personnel. The hands-on activities include handouts and video presentations to help students better understand the need to study and excel in mathematics, science and technology to pave the way to potential careers in the aerospace industry and to become productive members of society. I am the sole point of contact between the 33 schools this year and all the contractor/civil service presenters. I also provide the logistics of obtaining and distributing all materials, maintaining a database concerning this noteworthy program. A letter of Commendation has been received each year for the last 5-years.

3. Virginia Aviation & Space Education Forum (VASEF) - I have been president of this program for the last 3-years. There is a monthly meeting that provides for better communications between the Virginia Department of Aviation (Education outreach), The Virginia Science Museum, Federal Aviation Authority (FAA), Colleges and Universities in Virginia, and Virginia airport operators, which provide Airway Science Programs and NASA.

**D. Numerous other tasks that I perform are as follows:**

1. Act as the OEd primary point of contact for two of the four NASA enterprises; Aeronautics and Space Transportation Technology (ASTT) and the Human Exploration and development of Space (HEDS). This necessitates coordination activities at both state, regional and national levels. I am called upon to represent NASA at various conferences, necessitating providing in depth knowledge of the subject matter and providing hands-on demonstrations of educational techniques, and speaking engagements.

2. Act as a science fair judge for middle and high schools in Virginia.
3. Teach aerospace activities to K-12 teachers during the academic year at workshops and for Old Dominion University's Career Transition programs.
4. Provide hands-on aerospace careers presentations in the classroom at both elementary and middle school levels.
5. Provide speaker services for the NASA Speakers Bureau making presentations on the topics of ASTT and HEDS related subjects to both adult and student groups in the state of Virginia.
6. Act as the lead contractor for both HU & ODURF with respect to LaRC OEd.

*Peter D. Thomas*

Peter D. Thomas

To: S.N.TIWARI  
From: "Thomas E. Pinelli" <t.e.pinelli@larc.nasa.gov>  
Subject: Jennifer Pulley's Job Description  
Cc: s.e.massenberg, sr4rurr@netscape.net, w.b.williams  
Bcc:

Dear Dr. Tiwari:

I've put together the following position description (PD) for Jennifer Pulley. I've limited the PD to duties, knowledge required to perform the duties, and supervisory controls. I'm sending a cc of this message to Jennifer Pulley.

Thom Pinelli

*Jennifer Pulley Bibbo:  
B.A. in Speech Communication & Elementary Education  
Phone: 864-8048*

Duties

Works within the Office of Education as a member of the distance learning team. Uses collaboration, problem-solving skills, creativity, and critical thinking to perform the following duties. Frequent travel is required to perform the duties associated with this position. Performance of duties requires frequent interaction with individuals and groups inside the Center, Agency, the federal government, and within the educational community.

o Develops the instructional (i.e., educator and student) materials used to support the Office of Education (OEd) distance learning programs. These program include, but are not limited to, NASA CONNECT, NASA "Why"? Files, NASA's Kids Science News Network, and Destination Tomorrow.

o Develops instructional television programs designed to enhance and enrich the teaching of geography, math, science, and technology in grades K-12.

o Develops educational television programs for adult "life-long" learners designed to promote an understanding of complex, scientific and technological phenomena, research, facilities, and devices.

o Serves as the "on camera" talent and host for certain Office of Education distance learning programs.

o Assists in the technical and artistic production of certain Office of Education distance learning programs.

o Assists in the promotion, the evaluation, and the assessment of certain Office of Education distance learning programs.

o Assists the Precollege Office and the Distance Learning Officer in the performance of a variety of activities and undertakings.

o Knowledge of the methods, techniques, and practices associated with the development of original educational, instructional, and adult television programming.

o Ability to communicate effectively in oral and in written formats plus the ability to communicate effectively via television and other forms of media.

o Working knowledge of instructional technology, assessment, and evaluation.

o Ability to plan, organize, and take the lead responsibility for completing complex educational and instructional programs.

Knowledge (Ability and Experience) Required to Perform the Duties

- o Professional knowledge of preparing instructional materials for K-12 and adult audiences with knowledge acquired through academic preparation and professional work experience, and teaching.
- o Professional knowledge of curriculum content and teaching techniques with knowledge acquired through academic preparation and teaching.
- o Working knowledge of the national geography, math, and science standards and the Virginia Standards of Learning (SOL)'s.
- o Experience as an on camera talent for instructional and educational programs.

Supervisory Controls

1. The person holding this position is given considerable leeway to design, plan and manage assignments.
2. Work performed by this individual is reviewed in the context of meeting program objectives and milestones and to determine the contribution of the work to the OEd's distance learning program.